MARVELS FROM WOOD PULP

Wonderful Advance in the Development of a Great Industry.

ARTICLES MADE FROM THE SUBSTANCE

Silk Making the Latest Application of Pulp—Successful Experiments Abroad—Possibilities of the Industry.

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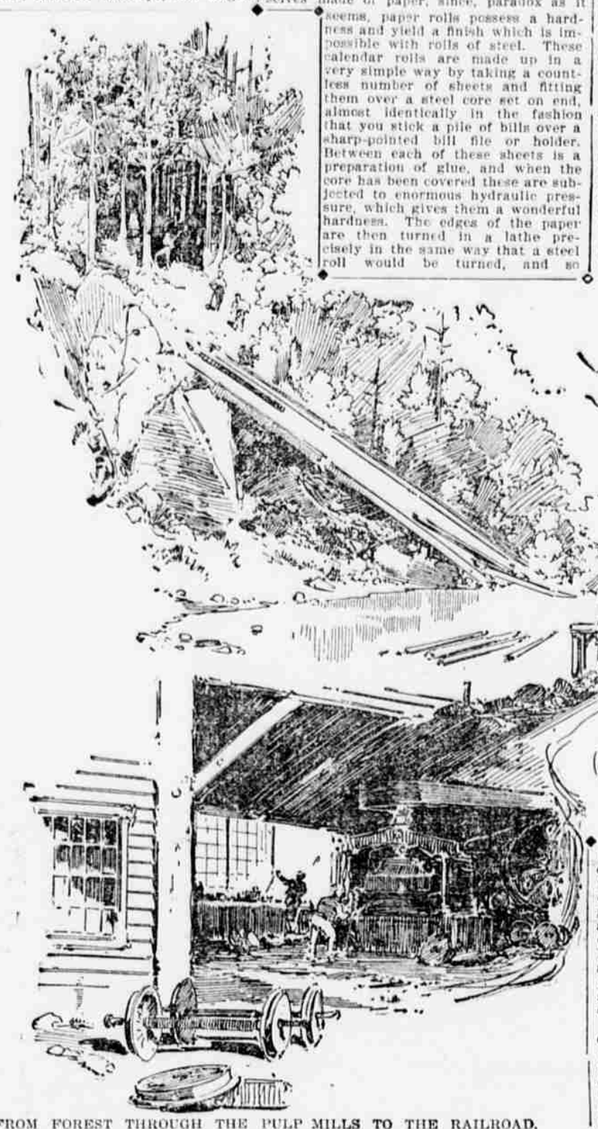
The announcement, made simultaneously in France and in England, that the discovery of a process for the manufacture of silk directly from wood pulp has proven an unquestionable commercial success means not only that the silk worm raising industry, as well as the silk worm itself, is doomed, but it marks the latest step in that wonderful advance, within the last ten years, in the use of wood pulp as a material for manufacture. Very few people probably are aware of the varied uses to which this product, technically known as "cellulose," is now put—that from it now comes the larger part of the paper which we use, and most of the car wheels of the coaches upon which we ride, and rails for railways, and wagon



FROM FOREST THROUGH THE PULP MILLS TO THE RAILROAD.

wheels, and horseshoes, imitation porcelainware, barrels, boats, window panes, furniture of many kinds, telegraph poles, drain pipes and tiling, paving brick, coffins, carpets, thread, heavy guns, matches, yes, and portable houses, paint, artificial teeth and even bicycle frames.

It would, indeed, require a long catalogue to tell of the protean forms which wood pulp is now made to assume. To it we owe the penny blanket sheet newspapers and the marvelously low priced magazines and cheap books and cheap wrapping paper. There are in the United States two newspapers which alone use up in a year more paper than was produced in the whole country twenty-five years ago, and there are five of six newspapers in the United States which together use up more paper than was made in the whole world at that period. Today great forests are being annually slaughtered to afford material for the wood pulp machines. An enormous industry has been built up in this and other countries, whose capitalization and annual product runs up into the hundreds of millions. And still those engaged in the industry regard it as yet in the stage of short dresses.

SILK FROM WOOD PULP.

The latest application, to the manufacture of silk, seems to confirm this view. Almost all the uses of cellulose, indeed, aside from that for paper making, have come within the last ten years, and probably the last year has seen more new uses made of this remarkable substance than in all the other ten put together. New patents are being taken out every month, and with the enormous extension that will be made by the invasion of the vast spruce and fir forests of the North Pacific coast in this country, and of Siberia, it is entirely probable that the next few years will witness a still more remarkable advance.

This late development is somewhat curious in view of the fact that the idea of grinding wood up into pulp and employing it for various purposes is not nearly so new as most people suppose. As far back as 1719, a Frenchman named Reamur published an essay upon the subject, taking his hint from the wasps, whose paper-like nests are literally made from wood pulp manufactured by these insects. But it was only something like thirty or forty years ago that any practical trial of the matter was made, and it is almost wholly within the last quarter of a century that the industry has begun to assume any importance. Its first, and still its principal application, was in the manufacture of paper. In the beginning, it was used purely as an accessory to rags and straw fiber, it being originally the belief that a paper of sufficient strength and firmness of texture could not be made from wood pulp alone. Now, however, not only the paper upon which this article is printed, but the magazines and a very large proportion of the books now published are made wholly from pulp.

PRODUCTION OF PULP.

Of the latter, however, there are two distinct varieties, that of wood pulp proper and that which is more properly described as wood fiber. The first is obtained by a purely mechanical and the second chiefly by a chemical process. The production of wood pulp proper is simplicity itself. The logs, usually of spruce or fir, are cut into suitable lengths, from a foot and a half to four feet long, and these are then ready for the "grinders." These pieces have been carefully freed from any knots and denuded of bark, and care is taken that they shall be free from any defects or rot. The grinders are heavy machines, usually driven directly by a water-wheel, and very much resemble a wheat-grinding burr very much enlarged and set on its side. They consist of large rotary grindstones of a special strength, and of grips to hold the blocks against these stones. Hydraulic pressure forces the blocks of wood against the grinders, while a stream of water prevents their being burned by friction, and at the same time carries off the ground-up pulp. The latter is either fed directly to the paper-making machine, or else carried to dryers and compressers known as "wet" machines. In the case of the latter the pulp is made up in blocks, consisting of about two-thirds water and one-third pulp, and in this shape is ready for shipment.

If, however, the pulp is fed directly to the paper-making machine, it is first taken in hand by engines or beaters very much similar to those which handle the rags in rag paper making, which reduce the fibres to the proper length and give them the desired consistency. When a vat of pulp has been properly treated the mash is transferred to a receptacle where it awaits its use by the paper-making machine. By the latter it is taken up on an endless brass wire cloth, the meshes of which permit the water to escape as the cloth slowly travels forward. A simple contrivance keeps the wire cloth vibrating and assists in the knitting of fiber. Next an endless web of felt takes this thin layer of partially dried pulp and runs it through several large cold rollers, which remove the most of the remaining moisture and press the fibers into a closely-knit strip. From this point to the hot rollers the paper is carried without assistance of further webs, and as the successive hot rollers pass over it the paper becomes dry and firm. A series of calendar rolls next take it in hand and give it the desired smoothness and polish, and from thence it is cut up in sheets or wound on rolls as desired.

ROLLS OF PAPER.

Now, it is worth noting at this stage that the calendering rolls are very often themselves made of paper, since, paradox as it seems, paper rolls possess a hardness and yield a finish which is impossible with rolls of steel. These calendar rolls are made up in a very simple way by taking a countless number of sheets and fitting them over a steel core set on end, almost identically in the fashion that you stick a pile of bills over a sharp-pointed bill file or holder. Between each of these sheets is a preparation of glue, and when the core has been covered these are subjected to enormous hydraulic pressure, which gives them a wonderful hardness. The edges of the paper are then turned in a lathe precisely in the same way that a steel roll would be turned, and so

firm is the surface which the edges of the paper thus prepared presents that a sharp flint pebble, passed through the rolls, will be ground to pieces without making the slightest mark. Thus, in a literal sense, is paper made to make paper.

With the wood pulp thus prepared, it happens that it is impossible to secure the same strength and texture of rag-made paper, and for a long time at the beginning rag and straw pulp was mixed with the wood pulp, in order to obtain this desired strength for high grade papers. But at this point the chemists took up the problem and discovered two processes by which the wood was reduced to the required state without destroying the fiber, as is the case in grinding. These processes consist simply in the treatment of the wood cut in small chips, with alkaline or acid solutions. The wood is cut up into bits about an inch thick, and thrown into vats containing one of these solutions, and then boiled at a high temperature. This process reduces the wood to a soft, saponaceous mixture, when it is readily handled for the making of paper or any other desired article. This is of course much more expensive than simply putting the wood in a grindstone, and at the present time the ground-up wood pulp and the chemically prepared wood fiber are usually mixed, in certain proportions, to make the different grades of paper.

CAR WHEELS FROM PAPER.

But as already indicated, paper is now only one of countless forms in which this wood pulp or word fibre is now made up. Probably the next and most important employment is that for car wheels. These are, as a rule, made from straw pulp and directly from straw board. A solid disk or wheel, made up of a number of layers, much in the same way as the calendar rolls are made, is forced under strong pressure into a steel tire. Then into the center of this disk an axle box is thrust, under similar pressure. When first the straw board discs are put together, they are thrust under a hydraulic weight of 8,000 kilograms, for an hour, and a pressure of ninety to 120 tons is employed in fitting the tires. In this way a wheel is made that is about three times as durable as those made of steel, and furthermore, far more elastic.

This elasticity not only greatly increases ease of railway travel, but it diminishes the vibrations of the axle and bearings, the effect of these vibrations being to crystallize iron or steel, where the wheel is made of these latter substances. At Pullman, Ill., the chief seat of manufacture in this country, a pair of paper wheels have a recorded run of almost 1,500,000 miles, a record which is exceptional for any kind of metal.

This same wonderful hardness which is obtainable with paper, has very recently been turned to account in Berlin, Germany, in the making of paving brick. These latter are made from ordinary wood or straw pulp, to which sulphate of zinc is added as a preservative. The material being thoroughly mixed, it is put into a vat where other chemicals are added and then subjected to a pressure of 2,000 pounds to the square inch. The bricks thus formed are placed in a kiln and baked for forty-eight hours, much as bricks of clay. These wood pulp bricks weigh about three pounds, where those of the same size of clay weigh ten pounds, and are practically indestructible. Furthermore, they are said to make very little noise. Under this same process conduits for the use of electric or telephone cables are now being made, and drain tiling as well. Among the advantages claimed for the latter is its exceeding hardness, its light weight, its nonconductivity of heat or sound and sufficient elasticity to meet all requirements. The dampness, experienced usually in the case of stone, is also absent, and in price and appearance, the tiling takes rank over that made of clay. Similarly a dentist in Lubeck is a maker of paper or wood pulp teeth, said to be of fine quality.

CROWDING CUT STEEL.

A slightly different process is employed in the manufacture of wood pulp screws. These are usually of the larger size, and are made from a compound of fine pulp, clay, alkali, salsoda and glue. After casting, or rather pressing, the threads are cut and the stock then treated to a bath of sulphate of copper. An oil varnish finish completes the work, and a tough, elastic screw valuable for various uses is the result.

Yet another successful application of this curious substance is in the manufacture of telegraph poles. The latter are hollow and very much lighter than those that are made of wood, they are stronger and are said to be unaffected by sun, rain or any other causes which shorten the life of the ordinary wooden pole. The pulp is cast in a mold with a core in the center, forming a tube of the desired length. Coffins, too, are now made in Europe of wood pulp, which are susceptible of a high polish, look as well as the finest woods, and are much less expensive. Still another German genius has constructed a good sized cannon out of pulp, it having a steel core, and the exterior being bound by five lawers of metal wire. It is far lighter than a steel gun and is likewise said to be much stronger than a similar thickness of metal. Not to be behind the times, a Chicago genius has constructed a bicycle frame entirely of wood pulp, and would like to start a factory for the manufacture of paper bikes. Bicycle handles, made out of blotting paper, which in turn comes from pulp, are now not uncommon.

Every one is familiar with paper matches, which have come into general use. Strips of paper, about half an inch wide, are first drawn through a combustible vat and are then by machinery turned into long thin stems. These are cut into right lengths and the heads dipped into a solution of phosphorus wax and dried. Paper matches are cheaper to make than those of wood, and within a few years this industry has assumed such proportions that it is not impossible that the familiar wooden match will become a thing of the past.

BRANCHING OUT.

In its victorious advance, wood pulp now threatens to invade the cloth and leather industries, as it has that of paper, steel and others. A Frenchman named Claviez has invented a process of making paper thread. Before being cut in strips, the paper is steeped in certain chemicals which give it tenacity and ductility, and it is then wound on bobbins and twisted into threads and afterwards passed through a pair of cylinders to ccat it and give it a glossy appearance. This thread, the inventor claims, can be worked up into fabrics of various kinds and put to the ordinary uses. Still, another Frenchman has found a way to make excellent sailcloth out of pulp, and another genius makes a very good grade of carpet lining, which furnishes a mothproof and elastic foundation for the carpet. Yet another inventor, of Vienna, has found a process for the manufacture of artificial leather from reed beech and claims that a sole leather can thus be obtained superior to animal leather in firmness and durability.

A pair of English chemists have discovered a way to make a waterproof paint of wood pulp, which is sprayed over buildings, ships and the like. The process is simple and inexpensive, and for painting large surfaces much is expected of it. Still, again, a Frenchman has found a way to make paper bags that are impervious to water, and a Berlin inventor has produced a fireproof paper, thin and of good quality. For that matter, not long ago a wood pulp works constructed a stove out of paper, which answered every purpose as if it had been made of iron. It was, however, purely an experiment. Paper window panes were made several years ago in this country, and these have latterly been much improved on in France. They have the appearance of milky glass and are admirable for greenhouse use. In the latter country, too, portable houses are now made of wood pulp, very successfully, and a good grade of pulleys as well.

FUTURE POSSIBILITIES.

Paper boats and especially paper canoes are not at all new, but they have not come into general use as it was expected a few years ago that they would. Paper cuspidors, however, are to be found everywhere, and pails, flower pots and similar articles are now in common use. Paper furniture, tables, chairs and the like are as yet a novelty, so, too, is imitation porcelain ware, paper barrels, wagon wheels, horseshoes and the like. But all of these are being made in a small way, and indicate possibilities for the future.

The latest advance in the art, that of silk making, can now be said to be successful beyond question or doubt. Artificial silk is being made in considerable quantities by two English mills, and by several others in France. There is really nothing so very wonderful about it, since it is simply doing mechanically and chemically what the silk worm does. The latter simply eats up the leaves of the mulberry tree, digests them, adds a certain glue and spins the cellulose-like stuff thus formed into its cocoon. The new process similarly takes a suitable wood pulp, treats it chemically, and forces this mixture through fine tubes into running water, where it hardens and the thread thus formed is caught up by delicate fingers, dried, and spun into an ordinary silk thread. The fabric made from this thread is said to be detectible from real silk only by means of the microscope; it is susceptible of the highest finish, can be dyed in any colors, is strong and durable, and is very much cheaper than silk fabrics made from the product of the silk worm.

Perhaps it would be regarded as a hoax if I were to say that a fine Havana cigar may likewise be made from ordinary pulp, which only an expert can detect, but it is nevertheless a fact; and the sole reason that the manufacture is not general is that it is not now commercially profitable. Here, too, is nothing wonderful, since the source of a smoker's delight is simply a mesh of tasteless vegetables, flavored with certain chemicals. The laboratory process of the soil may be perfectly duplicated in the laboratory of the chemist, just as the work of the silk worm's belly may be duplicated by a machine. It is a wide and stretching vista which these facts suggest, and it requires no vivid imagination to plot the borders of the future of synthetic chemistry.

H. F. JOKOSA.

THE RECOMPENSE.

Cleveland Leader.

Sometimes I wonder if the man
Who wins renown on earth
Finds that the plaudits of the crowd
Are of exalted worth.
I wonder if, when in the tomb
His wasted clay is laid,
The labor and the loneliness
He knew have been repaid.

I wonder if the common man,
Who drifts along through life,
Content with love and praises from
His children and his wife,
Has not less cause to murmur at
The firm decrees of fate
Than he that frets for future men
To find that he was great?

AN IMPOSING COLLECTION

The Nucleus of a Musical Library Started in St. Louis.

SCOPE OF A NOTABLE PROJECT

Numbers of Rare Volumes and the Scores Composers Already Accumulated and Others to Be Added —Musicians Interested.

A movement is on foot to equip the St. St. Louis public library with a collection of books that will not only be of especial interest to the music loving public, but which, it is hoped and believed, will form the nucleus of the musical branch with which the contemplated library building of the future is to be endowed.

Prof. Fred M. Crunden, librarian, intends that a musical room will be one of the features of the library, says the St. Louis Republic, and with this end in view great steps have already been taken toward collecting an adequate number of the leading books about music from all quarters of the English-speaking world.

A committee composed of Prof. Alfred G. Robyn, Prof. Ernst Kroeger and the late Prof. Pommer once formulated a list of books, which, in their estimation, would form a good beginning for the Musical library. The possibility of formulating a society of students of musical composition, for the purpose of collecting the scores of the great composers, was discussed and the co-operation of the musically inclined public secured.

This initial portion of the work will be inaugurated this winter, and devotees of the great art will realize in a moment the importance and value of such a plan, not only to the reputation and facilities of St. Louis as a great musical center, but also to the opportunities and the advantages for study and recreation of a musical kind, that such a storehouse of treasures would mean for themselves.

There are very few wealthy enough to purchase for their own private use anything like an adequate collection of the scores of the composers and this is to be the feature of the plan contemplated, and it is thought that by a little hearty co-operation a vast and incomparable collection of the kind described can soon be gathered together and placed in the musical library, that should be one of the attractions of a city so well and favorably known as the home of several composers of national and in some cases international renown.

Among the great musicians who have helped to make St. Louis famous and who are expected to interest themselves in the musical affairs of the library, are Profs. Charles Drumheller, Charles Kunkel, Alfred Robyn, Charles Lange, Ernest Kroeger, M. A. Gilsinn, T. H. Simms, Max Bollman, Emil Karst, Eppstein brothers, August Waldauer, Otto Knaebele and perhaps a dozen others less widely known.

Prof. Crunden, librarian at the public library, is still acting on the suggestions of Messrs. Kroeger, Robyn and Pommer as rapidly as possible, and has just added and catalogued a large number of most interesting volumes upon musical topics.

AN IMPOSING LIST.

Following is a partial list of the most notable of these, and in it will be found books that will attract the favorable attention of all classes of people from the master of the art of musical construction down to the veriest neophyte, who is still conning "do-re-mi."

Dr. Riemann's "Catechism of Musical Instruments," a guide to instrumentation, is a book that will be found immensely useful as an aid to orchestration as well as in the study of harmony.

"Primitive Music," by Richard Wallaschek, is an inquiry into the origin and development of music, and tells entertainingly of the songs, dances and pantomimes of savage races. It gives illustrated examples of all these things and is both fascinating and instructive, as well as authoritative. A series, "Masters of Contemporaneous Music," embraces a biographical sketch of the principal living exponents of musical composition in the four greatest musical countries of Europe, viz: Germany, Italy, France and England. These four volumes are completely illustriated with portraits of such masters as Giuseppi Verdi, Sir Arthur Sullivan, Johannes Brahms and Ch. Gounod, and autograph scores.

Prof. Ebenezer Prout, professor of harmony and musical composition in the Royal Academy of London, is the author of five most valuable additions to the technical collection. They are "Harmony," "Counterpoint," "Fugue," "Fugal Analysis," "Double Counterpoint and Canon."

The story of British music from the earliest times to the Tudor period is entertainingly told by Fred J. Crowest, author of "The Great Tone Poets and Musical Anecdotes," and Ernest Newman's book about Gluck and the opera is another study of musical history.

Kleczynsky's book about Chopin's greater works contains what is left of Chopin's notes for the piano, and is of special interest, therefore, to students of the pianoforte. Matthews on phrasing, Lobe's catechism of composition, Marx's theory and practice of musical composition, "Musical Forms," by Pauer; Richter's "Manual of Harmony," "The Art of Tuning the Pianoforte."

Spanmann's "Attempt at an Analysis of Music" is described by a critic thus: "The modest title of one of the best philosophical treatises on our art yet published on this side of the Atlantic."

Stainer on harmony, Thibaut's "Heber Reinheit der Tokunst," Upton's "Standard Symphonies." A notable addition is that of J. F. Botume's "Modern Singing Methods: Their Use and Abuse."

BOOKS ON VOICE CULTURE.

Probably no laryngologist since Sir Morell Mackenzie has had a better opportunity for investigation of the subject of voice production and the effects upon the larynx of different methods of singing than has Dr. H. H. Curtis, the author of "Voice Building and Tone Placing," and therefore the addition of the book will be welcomed by all vocal students. As Dr. Curtis has dedicated his work to Jean de Reszkè, and has been guided in his chapters on voice building by no less a person than Mme. Melba, it is safe to say that this work will have an especial interest for teachers of vocal music.

Goodrich's "Analytical Harmony" is a volume of 400 pages, with 900 examples in musical type. The author deserves especial praise for basing his doctrines, not on previous theoretical works, most of which are somewhat antiquated, but on the compositions of modern masters. Cherubini, Jadassohn, Herman, Goetchius, Berlak and a score of others whose names are a guarantee of their works' merit, are among the list of authors that has been added.

Plans looking to the concentration of the work of collecting a library of scores also are being pushed by the composers of St. Louis, and it is likely that students and amateurs interested in the progress of that art will aid in the scheme.

PRATTLE OF THE YOUNGSTERS.

The minister, it was expected, would spend the evening with the family, and Mrs. Williams was most anxious that her little boy should appear at his best. "Now, Willie," she said, "Dr. Schultz will ask you your name, and you must tell him it is 'Willie.' And he will ask you how old you are, and then you must say, 'Five,' and he will want to know where bad little boys go, and you must tell him, 'They go to hell.' Do you understand?" Not content with a repetition once or twice, Mrs. Williams drilled him again and again in the answers.

Dr. Schulz came as expected, and, after a short conversation with the hostess, lifted the child on his knee and said: "Well, my little fellow, can you tell me your name?" Imagine the surprise of the reverend doctor when, like a flash, came the answer: "Willie. Five years old. Go to hell!"

George's father is a republican and up to a week ago all the children have been strong McKinley partisans. The other day, however, George walked proudly into the house with a silver bug pinned to his jacket. An elder brother took him to task.

"How's this, George? I thought you were for McKinley? That's a Bryan badge you've got on."

"I don't know," doubtfully responded Master George. "They say if McKinley is elected we must pay our debts in gold, and if Bryan is elected we can pay them in silver."

"What difference does that make to you?" said the brother. "You don't owe any money."

"Indeed I do," indignantly replied George. "I owe lots. Why, I owe 13 or 14 cents!"

"Well, suppose McKinley is elected, that won't make any difference to you about paying your debts."

"Won't it, though? That's all you know about it," was George's scornful reply. "When I ask papa for money he gives me a dime or a quarter. That's silver, ain't it? If McKinley's elected I've got to ask him for a gold dollar, haven't I? And if I ask him for a gold dollar he'll drop dead, won't he? No, sir, I am for Bryan!"

The argument ended right there.

Florence's father's initials are A. H. S., and while Florence knows her letters, she is not yet able to spell. The other day she came running to her mother.

"Oh, mamma," she exclaimed, "I can spell umbrella."

"I hardly think so," said her mother.

"But I can," she insisted.

"Very well; how do you spell it?"

"A. H. S.," she said promptly.

"Why, Florence," contended the mother, "that doesn't spell umbrella."

"Yes, but it does," she urged. "I saw it on papa's umbrella and I'd like to know why it would be there if it spelled something else."

OUT OF THE ORDINARY.

A million dollars in silver will weigh 56,931 pounds, or almost twenty-eight and one quarter tons.

"Gossamer iron," the wonderful product of the Swansea (Wales) iron mills, is so thin that it takes 4,800 sheets piled one on the other to make an inch in thickness.

One gigantic species of Costa Rican grasshopper lays 2,000 eggs in a single laying season, which extends over but three weeks.

M. Victor, the French naturalist, says that a toad will live 28 months completely imbedded in plaster of paris poured on as a liquid and then allowed to harden.

The largest steam hammer in France is that at the works of Marrel Freres, at Rives-de-Gier. It is of a hundred tons weight and works on an anvil which weighs 600 tons. The face of this anvil is a solid block of cast steel weighing 125 tons.

Arthur Bird of New York has eleven living children. He was 74 years old a few days since and had all his children to a birthday dinner. When the guests uncovered their plates each one was favored with ten crisp $1,000 bills as a birthday present.

Sir W. McGregor has come across an extraordinary language on the west coast of British New Guiana. It is spoken by the Dungerwab tribe and is remarkable as possessing some unusually long words. For example, says Sir William, our short numeral "ten" is expressed in Dungerwab by a word of twenty-six letters.

It is not generally known that in the human voice, though generally but of nine perfect tones, there are actually no less than 17,592,186,044,315 different sounds. These effects are produced by fourteen direct muscles, which give about 16,383 different sounds and thirty indirect muscles, which produce 73,741,823 sounds.

The friends of Julio Muller, son of a Panama merchant, had assembled to attend his funeral. He had taken an overdose of antipyrine, with apparently a fatal result, even the attending physicians pronouncing him dead. His appearance aroused the suspicion among his friends that he was not really dead. The authorities were called upon to make an investigation. When they arrived the coffin was already closed. After its being opened—lo! there was Muller alive and wondering what was the matter.

A remarkable march of 4,700 miles across Siberia, occupying almost a year, has just been completed by two Russian battalions of line infantry and two batteries of artillery, which lately reached their camp on the Amur. The troops marched 4,000 versts by land and made their way for 3,000 versts by water, half the distance on rafts constructed by themselves. Their losses were six men dead, twenty-seven left behind in hospitals, and twenty-nine horses. The others arrived in good condition and excellent spirits.

Early in the present century, when vessels sometimes cleared Pittsburg for a sea voyage, the captain of a ship arrived at Leghorn with a cargo. The officer who examined his papers at once said: "Sir, your papers are forged. There is no such place as Pittsburg in the world. Your vessel must be confiscated." The frightened captain then secured a map, directed the officer's attention to the Gulf of Mexico, pointed out the mouth of the Mississippi, followed that stream to the Ohio, thence to the forks, and said, though the map showed no such place: "There, sir, is the port where my vessel cleared out."

LABOR AND INDUSTRY.

There are 1,399 women postal clerks in England.

The next general assembly of the Knights of Labor will be held in Rochester, N. Y., in November.

The membership of the American Federation of Labor has increased 25 per cent in the last four months.

More gold watches are worn by artisans and laboring men in the United States than in any other country in the world.

At San Francisco the Board of Health has refused to employ any but union labor in whitening and painting school houses.

In the year 1829, in England, an invention for fulling bonnets and capes was prohibited, for it was "holden inconvenient to turn so many laboring men to idleness."

Of the 2,356,000 women and girls in England working for their living, only 104,000 are organized. They are distributed among the different branches of industry, as follows: Textile, 97,412; decoration, 820; clothing and leather, 2,109; divers industries, 3,027.

Carroll D. Wright, in his annual report as United States census commissioner, says that a committee has been appointed, consisting of the representatives of the various governments, to take a comparative census of every country some time during the year 1900.

Several thousand men in New York make living wages manufacturing doll carriages for the export trade. The best doll carriage sells for $16 and the cheapest for 25 cents. Seventy per cent of the total output of doll carriages are exported to South America, Australia and the United Kingdom.

J. Murrie, who claims to be the inventor of a successful aerial machine, is a master engineer at Cranston Hill, Glasgow. He speaks with the utmost confidence of his machine, which has occupied him for fifteen years. He says that it is a very great departure in aerial navigation and a big revelation in a particular line.

At a Barberton, O., match factory recently, 177,926,400 matches were made in a day. At that rate that factory can produce in a year 64,943,136,000 matches, which means 927 matches a year, or nearly three matches a day, for each one of the 70,000,000 inhabitants of the country. All this work is done by automatic machinery that is without its equal in the world.

Professor Franklin G. Robinson of Bowdoin college has invented a disinfecting lamp which is attracting attention. The value of formic aldehyde has been known since 1894, but its production was too slow for practical use. The new lamp forces the fumes of methyl alcohol through a platinized asbestos disk, evolving the aldehyde so rapidly that a large room can be thoroughly fumigated in two or three hours and at a small expense.